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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/804,004	03/12/2001	Marcel Eduard Irene Broekaart	NL 000314	8862

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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EXAMINER

HA, NATHAN W

PART UNIT PAPER NUMBER

2814

DATE MAILED: 01/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/804,004

Applicant(s)

BROEKAART ET AL.

Examiner

Nathan W. Ha

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5, 9, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Avanzino et al. (US 6,593,632, newly cited, hereinafter Avanzino.)

In regard to claim 1, in figs. 1-2b, Ngo discloses a method of manufacturing an electronic device comprising steps of:

applying a semiconductor substrate 12 (fig.1) which is provided with a conductor 16 at the surface, the conductor having a top surface portion and sidewall portions (not numbered) at least the top surface portion is provided with an etch stop layer 21 comprising silicon carbide, see the abstract;

applying a dielectric layer 19, see col. 4, lines 15-18;

etching a via in the dielectric layer over the conductor, see fig. 1, and stopping on the etch stop layer to creating exposed part of the etch stop layer, see fig. 1;

removing the exposed part of the etch stop layer inside the via from at least the top surface portion of the conductor, see fig. 1; and

filling the via with conductive material 11, see fig. 1 and col. 4, lines 25-27.

In regard to claim 2, the etch stop layer is applied to the top surface portion and the sidewall portions of the conductor, see fig. 1.

In regard to claim 3, see fig. 1.

In regard to claim 4, the etch stop layer is removed from inside the via from only the top surface portion of the conductor, see fig. 1.

In regard to claim 5, see fig. 1.

In regard to claim 9, see the abstract, where in the dielectric constant is less than 3.2.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avanzino as applied to claim 1-5, 9, and 12 above, and further in view of Boeck et al. (US 5,880,018, previously cited, hereinafter Boeck.)

In regard to claims 7-8, Dabbaugh discloses all of the claimed limitations as mentioned above, except the layer 160 being a capping layer and made of titanium nitride, for example.

Boeck, as previously mentioned, discloses an analogous device with further capping layer 64 disposed immediately on top of the conductor layer 55 and this

capping layer is made of titanium nitride in order to prevent diffusion from the above layer, see fig. 15 and col. 7, lines 40-54.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute layer 160 of Dabbaugh with capping layer 64 as taught by Boeck in order to obtain the advantage mentioned above.

In regard to claim 10, it is noted that the method of making dielectric layer by depositing materials such as hydrogen silsesquioxane, parylene and fluorinated polyimide is widely use to deposit low -K dielectrics since the thickness of the layer can be easily control by using this method.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to apply the well known method as taught by Boeck in Avanzino in order to obtain the advantage mentioned above.

5. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avanzino as applied to claims 1-5, 9, and 12 above, and further in view of Ngo et al. (US 6,190,966, newly cited, hereinafter, Ngo.)

In regard to claims 5 and 11, Avanzino discloses all of the claimed limitations as mentioned above except that the conductive layer is being made of tungsten.

Ngo, in fig. 10, discloses an analogous device including substrate 12, conductive layer 14e, and etch stop layer 20 and a conductive layer in the via made of tungsten in order to provide better access to the regions below, for example, gate, source and drain.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to apply the well known metal as taught by Ngo in Avanzino in order to provide better access to the regions below, for example, gate, source and drain since tungsten has high conductivity constant.

Response to Arguments

6. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (703) 305-3507. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and 308-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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Nathan Ha
December 30, 2003



A handwritten signature, possibly reading 'Nathan Ha', is written in black ink. Below the signature is a faint, rectangular stamp that appears to contain the text 'RECEIVED' and 'DECEMBER 30, 2003'.